

ABSTRACT OF THE DISCLOSURE

A semiconductor memory device includes a first insulation film which is provided on the inner surface of a trench formed in a semiconductor substrate and has its top located above the surface of the semiconductor substrate. A diffusion layer is formed within the semiconductor substrate, surrounding the deep portion of the trench. A first conductive layer is filled in the trench. A gate electrode is provided on a gate insulation layer formed on the surface of the semiconductor substrate. Source/drain diffusion layers are formed in the surface of the semiconductor substrate and sandwich a channel region below the gate electrode. A second conductive layer extends on the first conductive layer, the first insulation layer, and one of the source/drain diffusion layers.